Management of Beryllium at AWE Aldermaston

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Facility Remit

- To manage the AWE Be stockpile on behalf of MoD.
- To manufacture Be components for Service, Trials and R&D.

- These operations must be conducted safely and in accordance with agreed procedures.

- Operating Philosophy –

  - To prevent exposure to Be particulate by airborne and dermal routes
  - Assume 100% success of HVAC, and investigate ALL excursions.

Be processing areas

- Controlled:
  - “High” risk of airborne Be particulate.
  - Engineered HVAC system.
  - Use of a physical access barrier.
  - Wear coveralls, PAS etc.

- Supervised:
  - “Low” risk of airborne Be particulate.

Change barrier

HVAC design philosophy

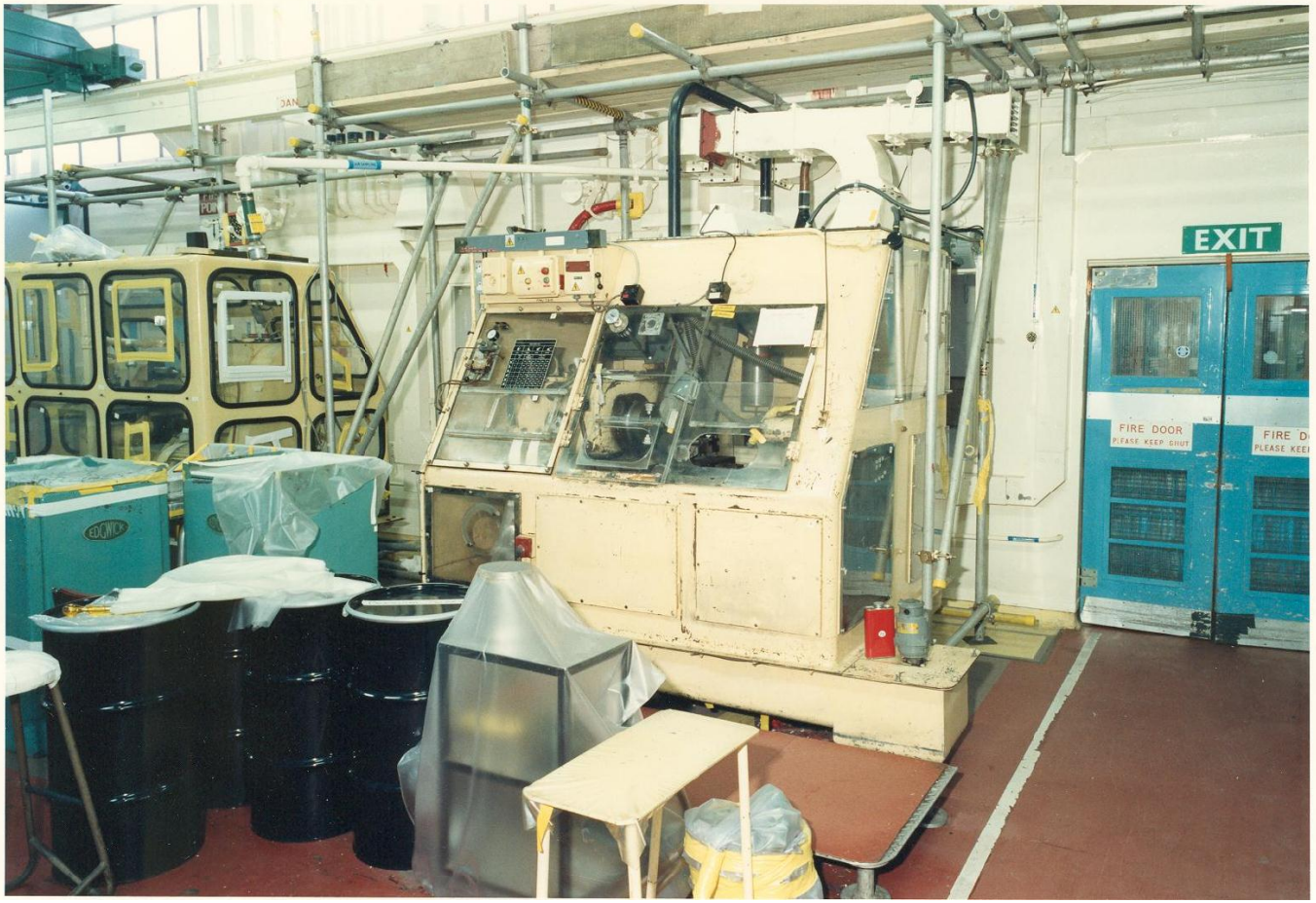
- It had been identified in the 1920s/30s that Be could cause respiratory problems.
- Therefore, when AWE was being built, the decision was made to treat Be identically to R/A materials, ie

Be processing operations would be fully contained within extracted enclosures.

Ventilation system

- Heirarchical – based on the processing hazard;
  - HPE – Gloveboxes (powder handling)
  - HVE – Tool tip swarf capture
  - LPE – Enclosures (general containment)
  - Plenum – supply air (heating and cooling)
- All ventilation plant – motors/fans/filters – in one plant room.
- A sampling system downstream of the (HEPA) filters allows quantification of airborne discharges – a Regulatory requirement.

Lathe containment – “then”



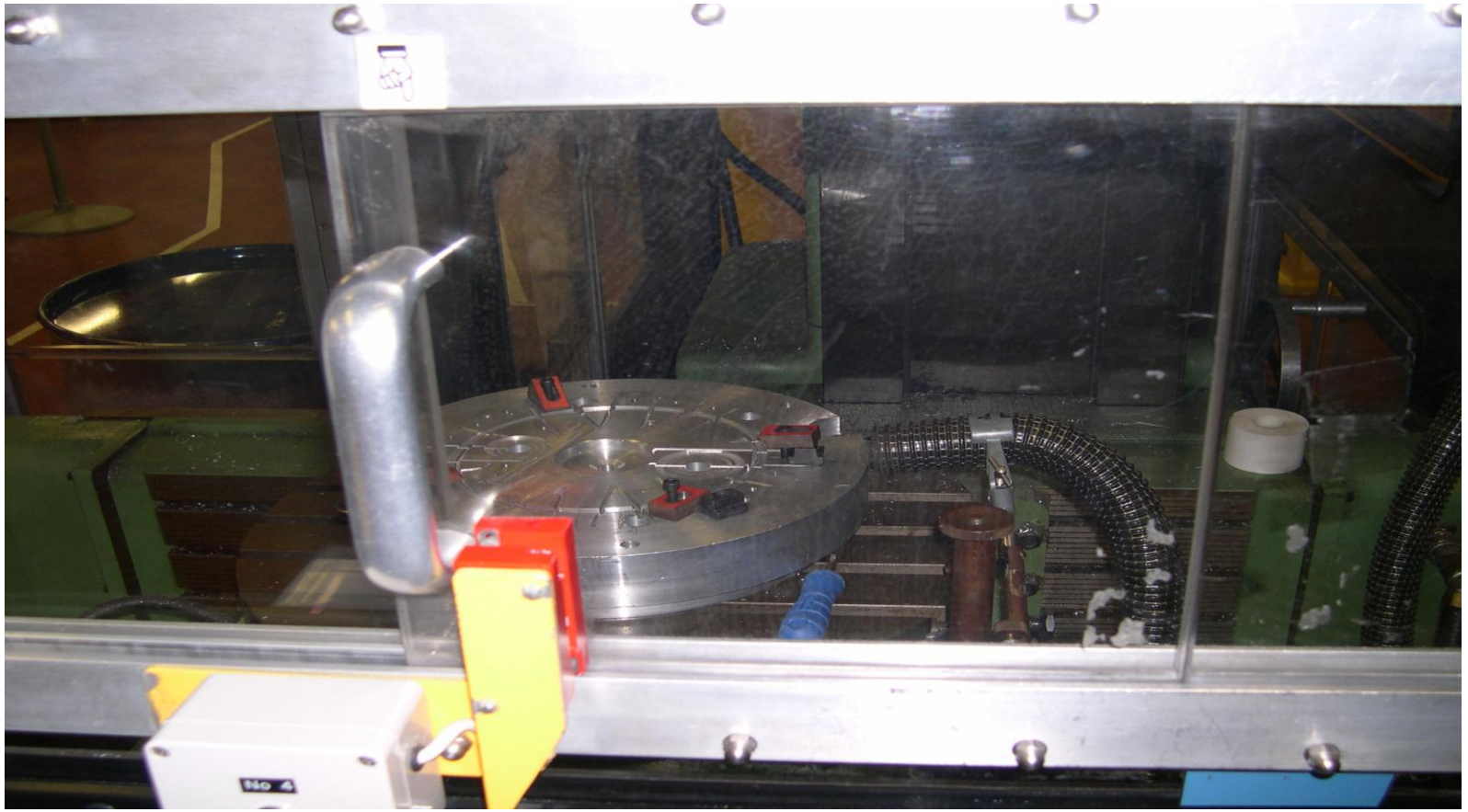
Lathe containment – “now”

Old TC1
(c. 1990)

New Production and
Samples lathes (c.2011)

Material Box - Glovebox side

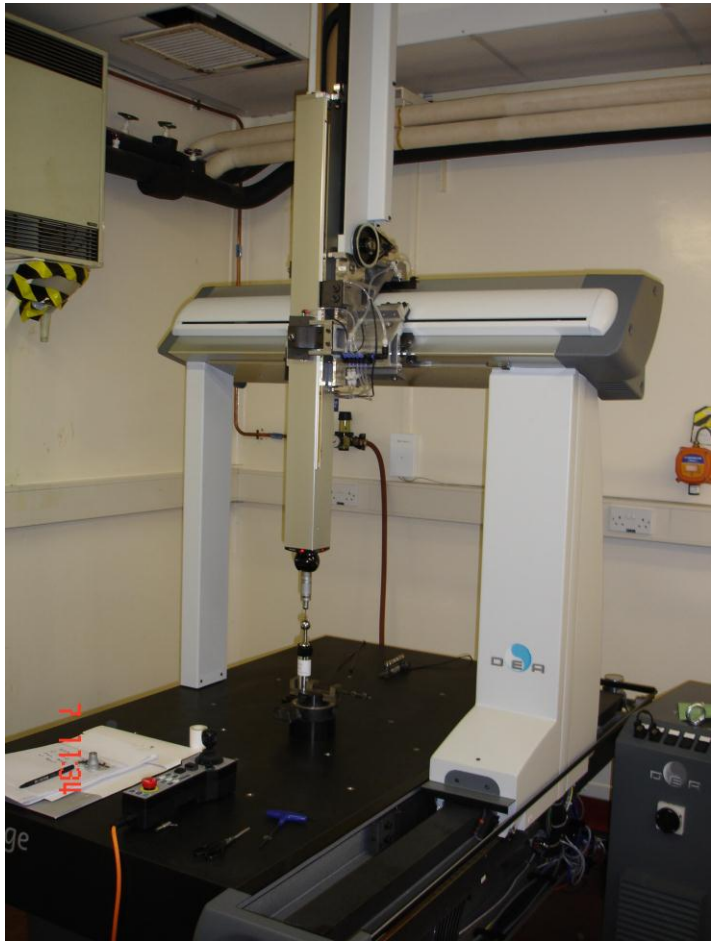
Mill Fixturing + HVE



Vibrophore and Instron Tensile Tester

Ultrasonic Vapour Degreaser

CMM



Data recording

- Four data fields recorded;
  - Personal Air Samplers (PASs)
  - Stack emissions – Regulatory requirement.
    - Discharge limit = 0.5 μg m^{-3}.
  - Surface smears.
  - Static Air Samplers (SASs)

Summary of PAS data: 01/01/97 – 31/12/12

	PAS reading - µg m^{-3}					
TOTAL	≤ 0.02	≤ 0.1	≤ 0.5	≤ 1.0	≤ 2.0	> 2.0
113032	111733	1234	57	4	2	2
% of total	98.85	1.092	0.05	0.004	0.002	0.002

Responses to excursions

- Airborne: (µg m^{-3})
  - > 0.02 (SAS) – local investigation
  - ≥ 0.25 (PAS) – formal local investigation
  - ≥ 0.5 (PAS) – suspend operation, formal local investigation.
- Surface: (µg ft^{-2} (!))
- Company guidance wrt levels;
  - ≤ 1 – Movement OK to a white area
  - ≤ 5 – Movement OK within a yellow (Be designated) area
- On the basis of operational history, a local management decision has been taken to reduce all working levels to that of a non-controlled Be area i.e <1.0µg/ft2 (10.0µg/m2).

CONCLUSIONS

- Primary concern is prevention of exposure to airborne Be particulate by inhalation.
- This achieved by;
  - Processing Be at workstations with extract ventilation,
  - Adopting rigorous procedural controls,
  - Assuming 100% success of the containment, and
  - Investigating ALL excursions.
- This approach shown to work by the Health Physics – PAS/SAS – data generated.
- This conclusion – based on AWE(A) operations – is confirmed by earlier AWE(C) operational Health Physics data.
- Since 1979, using this approach, in conjunction with our OH/Medical procedures, there have been no notified cases of CBD.